

## PATENT ABSTRACTS OF JAPAN

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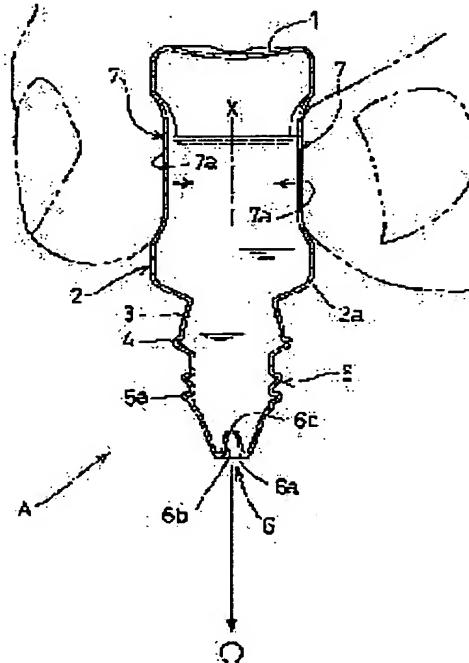
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## (54) EYEDROPPER WITH RECESSED SECTION

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide an easily usable eyedropper which is easy to hold and squeeze by performing simple and inexpensive remodeling on the barrel section of its main body.

**SOLUTION:** An eyedropper has a recessed section 7 which can be held between two fingertips and formed on its flexible hollow cylindrical barrel section 2.



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**CLAIMS**

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**[Claim(s)]**

**[Claim 1]** The hollow section formation instillation container with which the hollow section which can be grasped by two fingertips is formed in the bell shape drum section with flexibility.

**[Claim 2]** The hollow section formation instillation container according to claim 1 which consists of flat or almost flat grasping sides where said hollow section was become depressed and formed in each of two circumferencial directions of a drum section.

**[Claim 3]** The hollow section formation instillation container according to claim 2 with which said hollow section consists of grasping sides of a bow concave where the direction central site of a container axis was become depressed and formed in each of two circumferencial directions of a drum section in the condition of approaching a container axis side.

**[Claim 4]** The hollow section formation instillation container according to claim 1, 2, or 3 with which the body of a container equipped with said drum section consists of bodies of a container made from thermoplastics with which shaping and coincidence are filled up with a drug solution

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

[Field of the Invention] This invention relates to the instillation container with which the drum section is constituted by the bell shape with flexibility at least among the bodies of a container filled up with a drug solution.

**[0002]**

[Description of the Prior Art] The bell shape thing is used widely as the conventional instillation container, especially an instillation container used for medical-application eye lotions. For example, the container (for example, refer to JP,39-11991,Y) which really formed both the drum sections and pouring-in regio oralis of the body of a container in the bell shape with the container and blow molding which equipped with the inside plug the body of a container formed in the bell shape, a vacuum forming, etc. is used. Moreover, as the container raw material, elastic thermoplastics is used from the ease of shaping etc.

**[0003]**

[Problem(s) to be Solved by the Invention] With this kind of instillation container, when prescribing the drug solution within the body of a container for the patient, dropping supply of the drug solution is carried out from pouring-in opening of the body of a container by carrying out press actuation of the drum section of the body of a container at a container axis side, grasping the drum section of the body of a container by two fingertips, holding into the administration position in which pouring-in opening of the body of a container meets the eye for administration, and maintaining this position.

[0004] Although the instillation container formed in the bell shape is fabricated with elastic thermoplastics so that this press actuation can be performed easily, inconvenience may be sensed for control of press actuation in the weak elderly people of thrust etc. Moreover, in case a retention span performs press actuation in weak elderly people etc., the grasping location of a fingertip may be hard to be stabilized.

[0005] This invention is in the point of offering an instillation container with the sufficient user-friendliness which it succeeded in view of the above-mentioned actual condition, and the main technical problem had easy and cheap modification to the drum section of the body of a container, and was easy to have it, and was excellent in squeeze nature.

**[0006]**

[Means for Solving the Problem] The point that the hollow section which can be grasped by two fingertips is formed in the bell shape drum section with flexibility has the description configuration of the hollow section formation instillation container by claim 1 of this invention. According to the above-mentioned description configuration, since the hollow section formed in the drum section of a container is grasped by two fingertips in case the drug solution in a container is prescribed for the patient, the grasping location of a fingertip is stabilized. And since hollow formation of a part of drum section in contact with the fingertip has already been carried out when carrying out press actuation of the drum section of a container, as compared with the case where resist elastic stability and a part of cylinder-like drum section is made to become depressed and transform into it, the press operating physical force is mitigable. therefore, hollow

— though it became depressed in the cylindrical drum section and was easy and cheap modification which forms the section, as compared with the conventional instillation container, it was easy to have, and since squeeze nature was improvable with relief-ization of a press operating physical force, moreover, accuracy and a hollow section formation instillation container with the sufficient user-friendliness which can be easily prescribed for the patient were able to be offered for the drug solution in a container.

[0007] The description configuration of the hollow section formation instillation container by claim 2 of this invention has said hollow section in the point which consists of flat or almost flat grasping sides become depressed and formed in each of two circumferencial directions of a drum section. According to the above-mentioned description configuration, since the flat or almost flat grasping side formed in two places of a drum section will be grasped in case the drum section of a container is grasped by two fingertips, the local feeling of oppression of the grasped fingertip decreases, and the ease of having can be improved more.

[0008] The description configuration of the hollow section formation instillation container by claim 3 of this invention has said hollow section in the point which consists of grasping sides of a bow concave where the direction central site of a container axis was become depressed and formed in each of two circumferencial directions of a drum section in the condition of approaching a container axis side. According to the above-mentioned description configuration, since the grasping side of a bow concave near the curved surface of the fingertip formed in two places of a drum section will be grasped in case the drum section of a container is grasped by two fingertips, or there is no local feeling of oppression of the grasped fingertip, there is almost nothing and the ease of having can be improved further.

[0009] The description configuration of the hollow section formation instillation container by claim 4 of this invention has the body of a container equipped with said drum section in the point which consists of bodies of a container made from thermoplastics with which shaping and coincidence are filled up with a liquid. It is \*\*\*\*\* to improve the ease of having and squeeze nature, attaining cheap-ization of a manufacturing cost also to the medical-application instillation container with which cheap-ization of a manufacturing cost is demanded especially according to the above-mentioned description configuration.

[0010]

[Embodiment of the Invention] The [1st operation gestalt] Drawing 1 – drawing 5 show the hollow section formation instillation container of this invention mainly used for medical application, and consist of caps B screwed in male screw 5a formed in the screw cylinder part 5 of the body A of a container made from thermoplastics, and this body A of a container with the flexibility with which the drug solution of the specified quantity was filled up into blow molding or a vacuum forming, and coincidence free [ attachment and detachment ]. The pars basilaris ossis occipitalis 1 of the circle configuration to which said body A of a container curves inside, and the bell shape drum section 2 which stands in a row in the periphery of this. It consists of the neck 3 of the shape of a cylinder which follows shoulder part 2a of this drum section 2, a step 4 in a circle which bulges in the method of the outside of the diameter direction from the upside location of this neck 3, a screw cylinder part 5 equipped with male screw 5a which follows a this upside, and a pouring-in cylinder part 6 equipped with pouring-in opening 6a which follows a this upside.

[0011] As thermoplastics which is a component of this body A of a container, there are polyethylene, polyethylene polypropylene, polypropylene, polyethylene ethylene terephthalate, a polycarbonate, etc., and the fabricated whole body of container A is constituted possible [ elastic deformation ].

[0012] Inlet 6c of a controllable minor diameter is formed in the preset value at the pouring-in cylinder part 6 of said body A of a container in the amount of drops by which closed-end conic crevice 6b from which a bore serves as size becomes depressed, is formed, takes the pouring-in opening 6a side to the press actuation with the finger of said drum section 2 in the base of this crevice 6b, and it is extruded from the body A of a container. the depth of said crevice 6b — the range of 2-7mm — desirable — the range of 5-7mm — while constituting in 6mm most preferably, the aperture (month path) of said pouring-in opening 6a is adjusted in the range of

4.0mm of phi2.0 mm-phi according to the acidity or alkalinity of a drug solution. In order to fix-size one drop measure (it adjusts to the object within the limits of 25-50micropes 1 in all drop measure L), when it is acidity or alkalinity with large surface tension, aperture of said pouring-in opening 6a is made small, and when surface tension is small acidity or alkalinity, aperture of said pouring-in opening 6a is enlarged. Furthermore, said inlet 6c is formed using the needle of the path of the range of 0.8mm of phi0.1 mm-phi. Although the smaller one of the path of this needle is desirable and about phi0.2mm is the most desirable, since it will become difficult technically if it is not much small, the needle of the range of 0.6mm of phi0.4 mm-phi is actually used for it.

[0013] The hollow section 7 which can be grasped by two fingertips is formed in the drum section 2 of said body A of a container, and this hollow section 7 consists of pinching side 7a of the flat or almost flat couple become depressed and formed in each of the part which are two circumferential directions of a drum section 2, and carries out phase opposite on both sides of the container axis X further. Said each pinching side 7a consists of a direction of container axis X, and path directional vision (front view) which goes direct in the shape of [ with the interstitial segment parallel to the container axis X except the ends part of the direction of container axis X ] a straight line while curvature formation is gently carried out with curvature smaller than the curvature of other parts of a drum section 2 in container axis X directional vision.

[0014] When it screws in male screw 5a of the body A of a container, the plug-like projection 8 which carries out [ the projection ] inner fitting to crevice 6b of this body A of a container, and is sealed is really formed in said cap B.

[0015] The [2nd operation gestalt] Drawing 6 – drawing 10 show another operation gestalt of the hollow section 7 which can be grasped by two fingertips formed in the drum section 2 of said body A of a container, and this consists of grasping side 7b of a bow concave of the couple become depressed and formed in each of two circumferential directions of a drum section in the condition that the direction central site of container axis X approaches the container axis X side. While curvature formation is gently carried out with curvature smaller than the curvature of other parts of a drum section 2 in container axis X directional vision, by the direction of container axis X, and the path directional vision (front view) which goes direct, curvature formation of said each pinching side 7b is carried out in the condition that the direction central site of container axis X approaches the container axis X side so that curvature of a fingertip may be met mostly. In addition, since other configurations are the same as the configuration explained with the 1st operation gestalt, the same number as the 1st operation gestalt is appended to the same configuration part, and explanation of that is omitted.

[0016] The [3rd operation gestalt] Closed-end conic crevice 6b from which a bore becomes blow molding or the pouring-in cylinder part 6 of the body A of a container by which the vacuum forming was carried out with size with each above-mentioned operation gestalt in the pouring-in opening 6a side, Although inlet 6c of a minor diameter controllable to a preset value was explained about the instillation container currently formed beforehand, the amount of drops which takes to the press actuation by the fingertip of a drum section 2, and is extruded from the body A of a container As shown in drawing 11 instead of those who are limited to such an instillation container, the invention in this application To male screw 5a of the body A of a container made from thermoplastics which has the flexibility by which the drug solution of the specified quantity was filled up with and sealed in blow molding or a vacuum forming, and coincidence The cap B which has really formed the needlelike projection 9 for carrying out penetration formation of the inlet is screwed in the point of the body A of a container free [ desorption ]. By screwing actuation by the side of a bundle lump deeper one step than the usual closedown location of this cap B You may be the instillation container constituted so that inlet 6a may be formed in the point of the body A of a container by the needlelike projection 9 of Cap B. In addition, since other configurations are the same as the configuration explained with the 1st operation gestalt, the same number as the 1st operation gestalt is appended to the same configuration part, and explanation of that is omitted.

[0017] The [4th operation gestalt] Although the instillation container fabricated as said body A of a container where it has an inside plug function with blow molding or a vacuum forming was illustrated with the above-mentioned 1st and 2nd operation gestalt As shown in drawing 12

instead of what is limited to the instillation container of such a configuration, you may be the instillation container constituted by fitting in in the inside plug member 11 which the tubed regio oralis 10 of the body A of a container injection molded. In addition, since other configurations are the same as the configuration explained with the 1st operation gestalt, the same number as the 1st operation gestalt is appended to the same configuration part, and explanation of that is omitted.

[0018]

[Example] Two sorts of instillation containers which became depressed in the drum section concerning this invention, and formed the section, and the bell shape instillation container which becomes depressed in the drum section concerning the example of a comparison, and does not form the section were created, and squeeze nature was examined for the operability of these instillation containers as an index. The instillation container made from polyethylene concerning an example 1 has the configuration corresponding to the body A of a container of the 1st operation gestalt. In detail, the overall length of the direction of container axis X is 56.4mm, and the instillation container made from polyethylene concerning said example 1 has formed the aperture (month path) of said pouring-in opening 6a in 2.9mm. And said drum section 2 is formed in the shape of [ by which the vertical edge whose height is 33.7mm and the diameter of 19.6mm was beveled ] a cylinder. Furthermore, in the side face of said drum section 2, 19.5mm and width of face W become [ height H ] depressed in 13.3mm, said hollow section 7 of a couple is formed, and the depth D is set as 1.6mm by the deepest part ( drawing 1 , 2 reference). The instillation container made from polyethylene concerning an example 2 has the configuration corresponding to the body B of a container of the 2nd operation gestalt. In detail, the overall length of the direction of container axis X is 56.4mm, and the instillation container made from polyethylene concerning an example 2 has formed the aperture (month path) of said pouring-in opening 6a in 2.9mm. And said drum section 2 is formed in the shape of [ by which the vertical edge whose height is 33.7mm and the diameter of 19.6mm was beveled ] a cylinder. And in the side face of said drum section 2, 19.5mm and width of face W become [ said hollow section 7 of a couple / height H ] depressed in 13.3mm, it is formed, and the depth D is set as 1.6mm by the deepest part ( drawing 6 , 7 reference).

[0019] The conventional instillation container made from polyethylene concerning the example of a comparison will be the same configuration as said examples 1 and 2, if the point of having the bell shape drum section and having not prepared the hollow section is removed as shown in drawing 13 . Therefore, the same number as the 1st operation gestalt is appended to the same configuration part, and explanation of that is omitted.

[0020] Each of the instillation container made from polyethylene of these 3 type fused this by using TOSOH 175K (a trade name, TOSOH CORP. make) as a raw material, and it fabricated and it obtained so that weight might be set to 2.0, 2.2, and 2.4g per container.

[0021] Said pouring-in cylinder part 6 was placed upside down, and the instillation container made from polyethylene (specimen) which held water was set to the predetermined location of a measuring device. And the hollow section 7 (if it is in the example of a comparison) of this instillation container made from polyethylene After checking that apply the chip of said squeeze nature measuring instrument to a part for the lateral-surface center section of a drum section, and the interior except crevice 6b of said pouring-in cylinder part 6 is not full of water (air should not be piling up near [ said ] pouring-in opening 6a) Said chip was moved to the axis side of said instillation container made from polyethylene, it pressed, and the press operating physical force taken for one drop of water to trickle from pouring-in opening 6a of said instillation container made from polyethylene was measured by the digital force gauge of attachment in said measuring device. In the squeeze sex test of nine sorts of instillation containers made from polyethylene mentioned above, the 5 times trial per specimen was performed using five specimens to each kind. The average of these results is shown in a table 1.

[0022]

[A table 1]

水滴 1 滴を滴下するために必要な押圧操作力 (単位 N)

容器重量 (g)	実施例 1	実施例 2	比較例
2. 0	1. 78	2. 10	5. 35
2. 2	2. 39	2. 60	5. 93
2. 4	3. 34	3. 26	6. 15

[0023] It turns out that it is common in an example 1 and 2 lists that a press operating physical force required since one drop of water held in these is dropped so that the tare of said instillation container increases (i.e., so that the wall thickness becomes thick) as shown in a table 1 becomes large in all the examples of a comparison.

[0024] However, when the same tare compares, by the instillation container concerning the examples 1 and 2 which have formed said hollow section 7 in said drum section 7 being able to trickle contents(water) by the press operating physical force of abbreviation one half from the abbreviation 1/3 of a press operating physical force to the instillation container concerning the example of a comparison, and performing easy and cheap modification to the drum section of the body of a container shows that squeeze nature is improving. Thus, even if thrust and a retention span were weak persons by raising squeeze nature, easy \*\* was able to be operated and the instillation container at which the drug solution held in the container can be made dropped was able to be obtained.

[0025] [Other operation gestalten]

(1) Although curvature formation was gently carried out with curvature smaller than the curvature of other parts of a drum section 2 in container axis X directional vision, each pinching sides 7a and 7b which constitute said hollow section 7 from each above-mentioned operation gestalt Each pinching sides 7a and 7b may be formed in the concave bow which becomes depressed toward the flat side side of the shape of a straight line which meets a tangential direction in container axis X directional vision, or the container axis X side, and may be carried out.

(2) the hollow where flexibility has a drum section 2 at least as said body A of a container -- as long as it is constituted cylindrical, you may carry out using the body A of a container of what kind of structure.

(3) Although each pinching sides 7a and 7b which constitute said hollow section 7 were formed in two circumferential directions of a drum section 2 with each above-mentioned operation gestalt, it may form in three or more circumferential directions of a drum section 2, and you may carry out.

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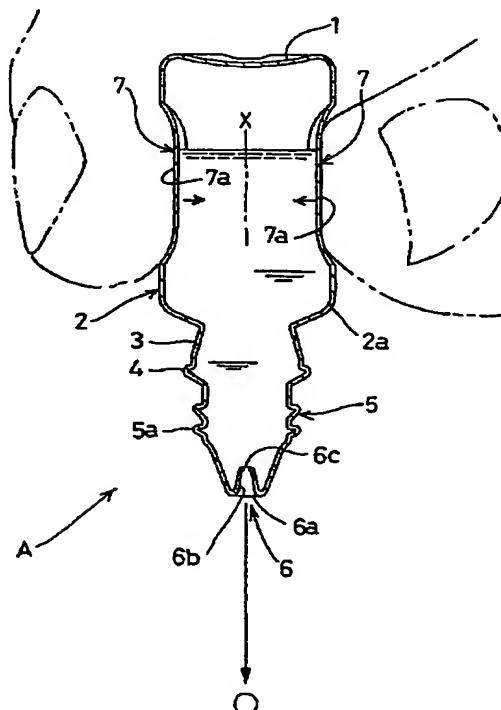
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(54) 【発明の名称】 窪み部形成点眼容器

## (57) 【要約】

【課題】 容器本体の胴部に対する簡単かつ安価な改造をもって、持ち易く、且つスクイズ性に優れた使い勝手の良い点眼容器を提供する。

【解決手段】 点眼容器のうち、可撓性のある中空円筒状の胴部2に、二本の指先で把持可能な窪み部7が形成されている。



## 【特許請求の範囲】

【請求項1】可撓性のある中空円筒状の胴部に、二本の指先で把持可能な窪み部が形成されている窪み部形成点眼容器。

【請求項2】前記窪み部が、胴部の円周方向二箇所の各々に窪み形成された偏平又はほぼ偏平な把持面から構成されている請求項1記載の窪み部形成点眼容器。

【請求項3】前記窪み部が、胴部の円周方向二箇所の各々に容器軸線方向中央側ほど容器軸線側に近づく状態で窪み形成された湾曲凹状の把持面から構成されている請求項2記載の窪み部形成点眼容器。

【請求項4】前記胴部を備えた容器本体が、成形と同時に薬液が充填される熱可塑性材料製の容器本体から構成されている請求項1、2又は3記載の窪み部形成点眼容器。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、薬液を充填する容器本体のうち、少なくとも胴部が可撓性のある中空円筒状に構成されている点眼容器に関する。

## 【0002】

【従来の技術】従来の点眼容器、特に医療用点眼液に使用される点眼容器としては、中空円筒状のものが汎用されている。例えば、中空円筒状に形成された容器本体に中栓を装着した容器、ブロー成形や真空成形等により容器本体の胴部及び注液口部を共に中空円筒状に一体形成した容器（例えば、実公昭39-11991号公報参照）が用いられている。また、その容器素材としては、成形の容易さ等から軟質の熱可塑性樹脂が用いられている。

## 【0003】

【発明が解決しようとする課題】この種の点眼容器では、容器本体内の薬液を投与する場合、容器本体の胴部を二本の指先で把持して、容器本体の注液口が投与対象の眼に對面する投与姿勢に保持し、この姿勢を維持しつつ容器本体の胴部を容器軸線側に押圧操作することにより、容器本体の注液口から薬液を滴下供給する。

【0004】この押圧操作が容易にできるよう、中空円筒状に形成された点眼容器は軟質の熱可塑性樹脂で成形されているが、押圧力の弱い高齢者等においては押圧操作の制御に不自由を感じることがある。また、把持力が弱い高齢者等においては押圧操作を行う際、指先の把持位置が安定しづらい場合もある。

【0005】本発明は、上述の実状に鑑みて為されたものであって、その主たる課題は、容器本体の胴部に対する簡単かつ安価な改造をもって、持ち易く、且つスクイズ性に優れた使い勝手の良い点眼容器を提供する点にある。

## 【0006】

【課題を解決するための手段】本発明の請求項1による

窪み部形成点眼容器の特徴構成は、可撓性のある中空円筒状の胴部に、二本の指先で把持可能な窪み部が形成されている点にある。上記特徴構成によれば、容器内の薬液を投与する際、容器の胴部に形成された窪み部を、二本の指先で把持するから、指先の把持位置が安定する。しかも、容器の胴部を押圧操作するとき、その指先に接觸している胴部の一部が既に窪み形成されているから、円筒状の胴部の一部を弾性復元力に抗して窪み変形させる場合に比して、その押圧操作力を軽減することができる。従って、中空円筒状の胴部に窪み部を形成するだけの簡単かつ安価な改造でありながら、従来の点眼容器に比して持ち易く、しかも、押圧操作力の軽減化によってスクイズ性を改善することができるから、容器内の薬液を正確、容易に投与することのできる使い勝手の良い窪み部形成点眼容器を提供することができた。

【0007】本発明の請求項2による窪み部形成点眼容器の特徴構成は、前記窪み部が、胴部の円周方向二箇所の各々に窪み形成された偏平又はほぼ偏平な把持面から構成されている点にある。上記特徴構成によれば、容器の胴部を二本の指先で把持する際、胴部の二箇所に形成された偏平又はほぼ偏平な把持面を把持することになるから、把持した指先の局部的な圧迫感が少なくなり、持ち易さをより改善することができる。

【0008】本発明の請求項3による窪み部形成点眼容器の特徴構成は、前記窪み部が、胴部の円周方向二箇所の各々に容器軸線方向中央側ほど容器軸線側に近づく状態で窪み形成された湾曲凹状の把持面から構成されている点にある。上記特徴構成によれば、容器の胴部を二本の指先で把持する際、胴部の二箇所に形成された指先の曲面に近い湾曲凹状の把持面を把持することになるから、把持した指先の局部的な圧迫感がない又は殆どなく、持ち易さを一層改善することができる。

【0009】本発明の請求項4による窪み部形成点眼容器の特徴構成は、前記胴部を備えた容器本体が、成形と同時に液体が充填される熱可塑性材料製の容器本体から構成されている点にある。上記特徴構成によれば、特に、製造コストの低廉化が要求される医療用点眼容器に対しても、製造コストの低廉化を図りつつ、持ち易さとスクイズ性を改善することができる。

## 【0010】

【発明の実施の形態】【第1実施形態】図1～図5は、主として医療用に用いられる本発明の窪み部形成点眼容器を示し、ブロー成形又は真空成形と同時に所定量の薬液が充填された可撓性のある熱可塑性材料製の容器本体Aと、該容器本体Aのネジ筒部5に形成された雄ネジ5aに着脱自在に螺合されるキャップBとから構成されている。前記容器本体Aは、内側に彎曲する円形状の底部1と、これの周縁に連なる中空円筒状の胴部2と、該胴部2の肩部分2aに連続する円筒状の首部3と、該首部3の上側位置から直径方向外方に膨出する円環状段部4

と、これの上側に連続する雄ネジ5aを備えたネジ筒部5と、これの上側に連続する注液口6aを備えた注液筒部6とから構成されている。

【0011】この容器本体Aの構成材料である熱可塑性材料としては、ポリエチレン、ポリエチレンーポリプロピレン、ポリプロピレン、ポリエチエチレンテレフタレート、ポリカーボネート等があり、成形された容器本体A全体が弾性変形可能に構成されている。

【0012】前記容器本体Aの注液筒部6には、注液口6a側ほど内径が大となる有底円錐状の凹部6bが窪み形成され、この凹部6bの底面には、前記胴部2の指による押圧操作に連れて容器本体Aから押出される液滴量を設定量に制御可能な小径の注液孔6cが形成されている。前記凹部6bの深さは2~7mmの範囲、好ましくは、5~7mmの範囲、最も好ましくは6mmに構成するとともに、前記注液口6aの口径(口元径)は、薬液の液性に合わせて $\phi$ 2.0mm~ $\phi$ 4.0mmの範囲で調整する。1滴量を一定化(目的に合わせて1滴量当たり25~50 $\mu$ Lの範囲内に調整)するため、表面張力が大きい液性の場合は、前記注液口6aの口径を小さくし、表面張力が小さい液性の場合は、前記注液口6aの口径を大きくする。更に、前記注液孔6cは、 $\phi$ 0.1mm~ $\phi$ 0.8mmの範囲の径の針を用いて形成する。この針の径は、小さい方が好ましく、 $\phi$ 0.2mm程度が最も好ましいが、あまり小さいと技術的に困難となるので、実際には、 $\phi$ 0.4mm~ $\phi$ 0.6mmの範囲の針を用いる。

【0013】前記容器本体Aの胴部2には、二本の指先で把持可能な窪み部7が形成されており、更に、この窪み部7は、胴部2の円周方向二箇所で、かつ、容器軸線Xを挟んで相対向する部位の各々に窪み形成された偏平又はほぼ偏平な一对の挟持面7aから構成されている。前記各挟持面7aは、容器軸線X方向視においては胴部2の他の部位の曲率よりも小さな曲率で緩やかに彎曲形成されているとともに、容器軸線X方向と直行する径方向視(正面視)では、その容器軸線X方向の両端部分を除く中間部分が容器軸線Xと平行な直線状に構成されている。

【0014】前記キャップBには、容器本体Aの雄ネジ5aに螺合したとき、該容器本体Aの凹部6bに内嵌して密封する栓状突起8が一体形成されている。

【0015】【第2実施形態】図6~図10は、前記容器本体Aの胴部2に形成された二本の指先で把持可能な窪み部7の別実施形態を示し、これは、胴部の円周方向二箇所の各々に容器軸線X方向中央側ほど容器軸線X側に近づく状態で窪み形成された一对の湾曲凹状の把持面7bから構成されている。前記各挟持面7bは、容器軸線X方向視においては胴部2の他の部位の曲率よりも小さな曲率で緩やかに彎曲形成されているとともに、容器軸線X方向と直行する径方向視(正面視)では、指先の

彎曲にほぼ沿うように、容器軸線X方向中央側ほど容器軸線X側に近づく状態で彎曲形成されている。尚、その他の構成は、第1実施形態で説明した構成と同一であるから、同一の構成箇所には、第1実施形態と同一の番号を付記してそれの説明は省略する。

【0016】【第3実施形態】上述の各実施形態では、ブロー成形又は真空成形された容器本体Aの注液筒部6に、注液口6a側ほど内径が大となる有底円錐状の凹部6bと、胴部2の指先による押圧操作に連れて容器本体Aから押出される液滴量を設定量に制御可能な小径の注液孔6cとを予め形成してある点眼容器について説明したが、本願発明は、このような点眼容器に限定される者ではなく、図11に示すように、ブロー成形又は真空成形と同時に所定量の薬液が充填・密封された可撓性のある熱可塑性材料製の容器本体Aの雄ネジ5aに、容器本体Aの先端部に注液孔を貫通形成するための針状突起9を一体形成してあるキャップBを脱着自在に螺合して、該キャップBの通常の閉止位置よりも一段深い締込み側への螺合操作により、キャップBの針状突起9で容器本体Aの先端部に注液孔6aを形成するように構成してある点眼容器であってもよい。尚、その他の構成は、第1実施形態で説明した構成と同一であるから、同一の構成箇所には、第1実施形態と同一の番号を付記してそれの説明は省略する。

【0017】【第4実施形態】上述の第1、第2実施形態では、前記容器本体Aとして、ブロー成形又は真空成形によって中栓機能を備えた状態で成形された点眼容器を例示したが、このような構成の点眼容器に限定されるものではなく、図12に示すように、容器本体Aの筒状口部10に、射出成形された中栓部材11を嵌合して構成される点眼容器であってもよい。尚、その他の構成は、第1実施形態で説明した構成と同一であるから、同一の構成箇所には、第1実施形態と同一の番号を付記してそれの説明は省略する。

【0018】

【実施例】本発明に係る胴部に窪み部を形成した2種の点眼容器と、比較例に係る胴部に窪み部を形成していない中空円筒状の点眼容器とを作成し、これらの点眼容器の操作性を、スクイズ性を指標として検討した。実施例1に係るポリエチレン製点眼容器は、第1実施形態の容器本体Aに対応する形状を有しているものである。詳しくは、前記実施例1に係るポリエチレン製点眼容器は、その容器軸線X方向の全長が56.4mmであって、前記注液口6aの口径(口元径)を2.9mmに形成している。そして、前記胴部2は、高さが33.7mm、直徑19.6mmの上下端が面取りされた円筒状に形成されている。さらに前記胴部2の側面には、一对の前記窪み部7が、高さHが19.5mm、幅Wが13.3mmに窪み形成され、その深さDは最深部で1.6mmに設定されている(図1、2参照)。実施例2に係るポリエ

チレン製点眼容器は、第2実施形態の容器本体Bに対応する形状を有しているものである。詳しくは、実施例2に係るポリエチレン製点眼容器は、その容器軸線X方向の全長が56.4mmであって、前記注液口6aの口径(口元径)を2.9mmに形成してある。そして、前記胴部2は、高さが33.7mm、直径19.6mmの上下端が面取りされた円筒状に形成してある。そして、前記胴部2の側面には、一对の前記窪み部7が高さHが19.5mm、幅Wが13.3mmに窪み形成され、その深さDは最深部で1.6mmに設定されている(図6、7参照)。

【0019】比較例に係る従来のポリエチレン製点眼容器は、図13に示すように、中空円筒状の胴部を有していて、窪み部を設けていない点を除けば、前記実施例1、2と同じ構成である。従って、同一の構成箇所には、第1実施形態と同一の番号を付記してその説明は省略する。

【0020】これら3タイプのポリエチレン製点眼容器のそれぞれは、東ソー175K(商品名、東ソー株式会社製)を原料とするものであって、これを融溶し、1容

水滴1滴を滴下するために必要な押圧操作力(単位N)

容器重量(g)	実施例1	実施例2	比較例
2.0	1.78	2.10	5.35
2.2	2.39	2.60	5.93
2.4	3.34	3.26	6.15

【0023】表1に示すように、前記点眼容器の容器重量が増加するほど、即ち、その壁厚が厚くなるほど、これらに収容した水を1滴滴下するために必要な押圧操作力が大きくなることは、実施例1、2並びに比較例のすべてにおいて共通していることがわかる。

【0024】しかし、同じ容器重量で比較すると、前記窪み部7を、前記胴部7に形成してある実施例1、2に係る点眼容器は、比較例に係る点眼容器に対する押圧操作力の約1/3から約半分の押圧操作力で内容物(水)を滴下することができ、容器本体の胴部に対して簡単かつ安価な改造を施すことによって、スクイズ性が向上していることがわかる。このようにしてスクイズ性を向上させることによって、押圧力や把持力が弱い人であっても、容易にを操作して、容器内に収容された薬液を滴下させることができる点眼容器を得ることができた。

#### 【0025】[その他の実施形態]

(1) 上述の各実施形態では、前記窪み部7を構成する各挟持面7a, 7bを、容器軸線X方向視において胴部2の他の部位の曲率よりも小さな曲率で緩やかに彎曲形成したが、各挟持面7a, 7bを、容器軸線X方向視において接線方向に沿う一直線状の偏平面、又は、容器軸線X側に向かって窪む凹状湾曲に形成して実施してもよい。

(2) 前記容器本体Aとしては、少なくとも胴部2が

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器あたり重量が2.0、2.2及び2.4gになるように成形して得た。

【0021】水を収容したポリエチレン製点眼容器(検体)を、前記注液筒部6を下向きにして、測定装置の所定位置にセットした。そして、このポリエチレン製点眼容器の窪み部7(比較例にあっては、胴部)の外側面中央部分に前記スクイズ性測定器のチップを当て、前記注液筒部6の凹部6bを除く内部に水が充満していないこと(前記注液口6a付近に空気が滞留していないこと)を確認してから、前記チップを前記ポリエチレン製点眼容器の軸線側に移動させて押圧し、前記ポリエチレン製点眼容器の注液口6aから1滴の水が滴下するのに要する押圧操作力を、前記測定装置に付属のデジタルフォースゲージで測定した。前述した9種のポリエチレン製点眼容器のスクイズ性試験において、それぞれの種に対して5本の検体を用いて、1本の検体につき5回試験を行なった。これらの結果の平均値を表1に示す。

#### 【0022】

#### 【表1】

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可撓性のある中空円筒状に構成されているものであれば、如何なる構造の容器本体Aを用いて実施してもよい。

30 (3) 上述の各実施形態では、前記窪み部7を構成する各挟持面7a, 7bを、胴部2の円周方向二箇所に形成したが、胴部2の円周方向三箇所以上に形成して実施してもよい。

#### 【図面の簡単な説明】

【図1】本発明の窪み部形成点眼容器の第1実施形態を示す容器本体の正面図

【図2】容器本体の側面図

【図3】点眼容器全体の断面側面図

【図4】容器本体の断面平面図

【図5】滴下投与時の容器本体の断面側面図

【図6】本発明の窪み部形成点眼容器の第2実施形態を示す容器本体の正面図

【図7】容器本体の側面図

【図8】点眼容器全体の断面側面図

【図9】容器本体の断面平面図

【図10】滴下投与時の容器本体の断面側面図

【図11】本発明の窪み部形成点眼容器の第3実施形態を示す全体の断面正面図

【図12】本発明の窪み部形成点眼容器の第4実施形態を示す全体の断面正面図

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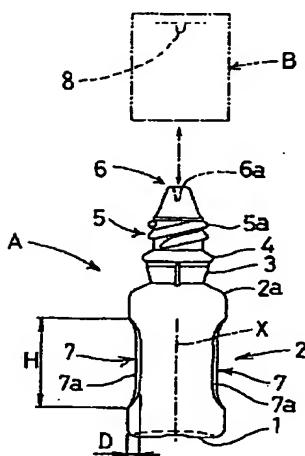
【図13】比較例に係る容器本体の側面図

【符号の説明】

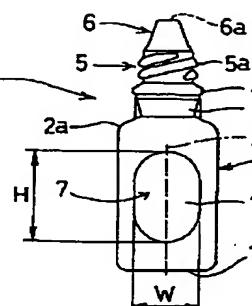
A 容器本体  
X 容器軸線

2 脊部  
7 崩み部  
7a 挟持面  
7b 挟持面

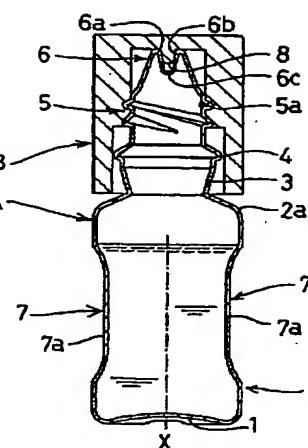
【図1】



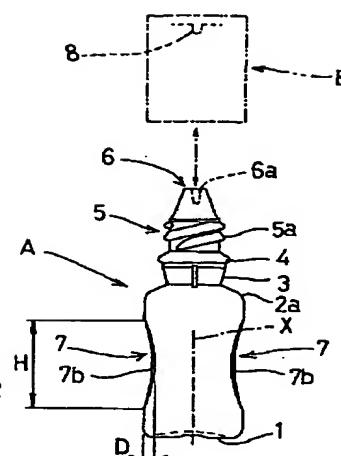
【図2】



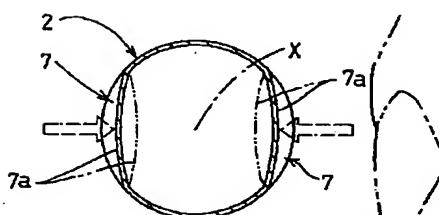
【図3】



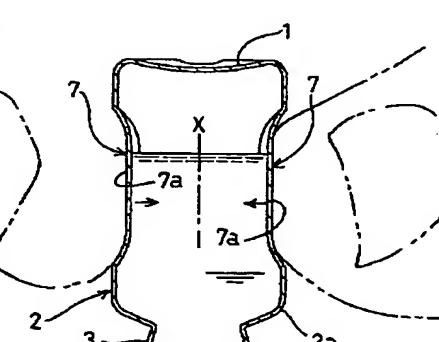
【図6】



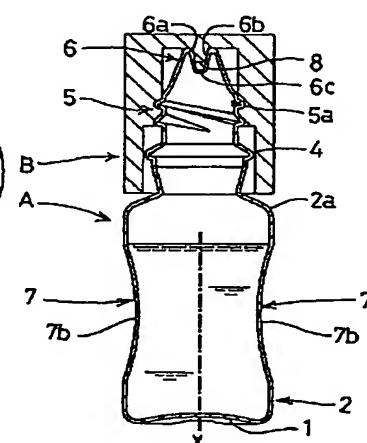
【図4】



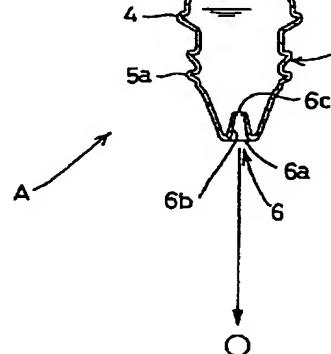
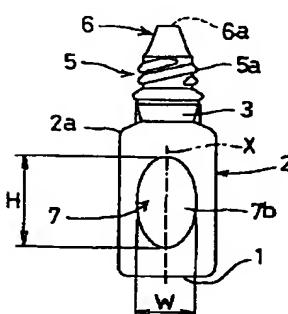
【図5】



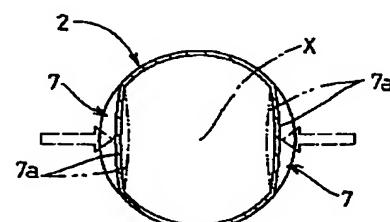
【図8】



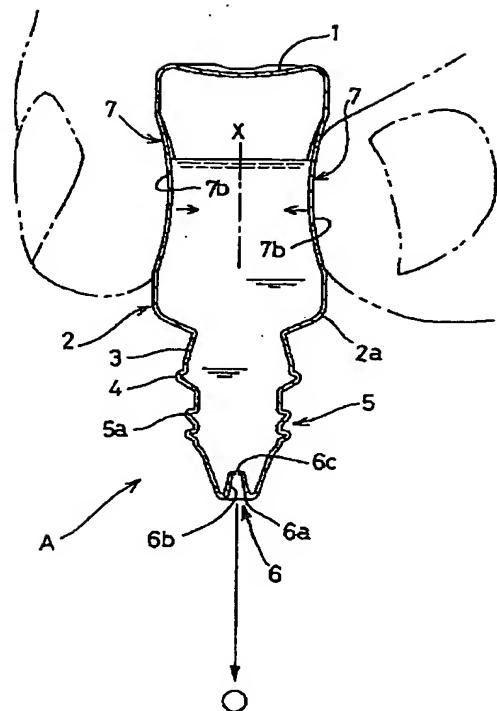
【図7】



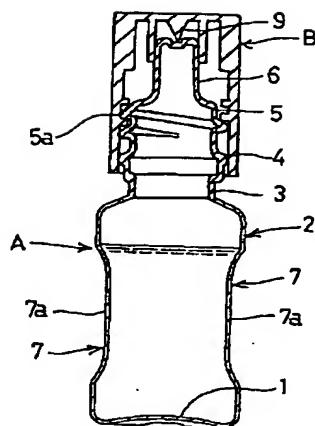
【図9】



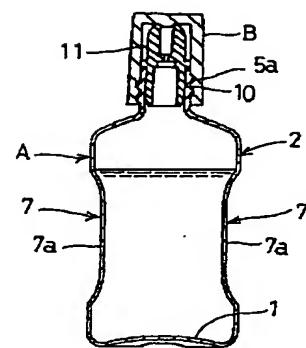
【図 1 0】



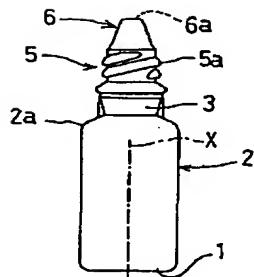
【図 1 1】



【図 1 2】



【図 1 3】



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